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(71) Applicant: **SUMITOMO RUBBER INDUSTRIES LIMITED**
Kobe-shi, Hyogo-ken (JP)

(72) Inventor: **Suzuki, Kazuya**
c/o Sumitomo Rubber Industries Ltd.
Chuo-ku, Kobe-shi, Hyogo-ken (JP)

(74) Representative:
Manitz, Finsterwald & Partner GbR
Postfach 31 02 20
80102 München (DE)

(54) Vehicle tire

(57) A vehicle tire provided with a protective film which covers a surface of the tire is disclosed, wherein the protective film is indicative of at least one of tire data including tire conicity and radial force variation of the tire and can be washed away with water. Also a method of fitting tires on a vehicle is disclosed, wherein the installing positions of the tires are determined according to the data indicated by the protective film, and thereafter the protective film is washed away with water.

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oily substance. In this case, the undercoat 10A is an almost invisible film of the oily substance. As the film repels the overcoat paint 11A, the mark 10 which is readily visible appears by applying the overcoat paint 11A thereon as being a part devoid of the overcoat paint 11A and being of a black color. when the overcoat paint 11A is washed away after served its purpose, the mark 10 accordingly disappears. For the oily substance, vegetable oil and fat, animal fat and oil, and the like can be suitably used. Especially, vegetable oil which is in liquid form at room temperature such as olive oil is preferably used because it is environment-friendly, odor-free and low-cost, and further it is easy to apply due to low viscosity.

Example (II) of undercoat 10A:

[0016] The undercoat 10A is formed by applying a colored water-soluble paint which is the substantially same as the above-mentioned overcoat paint 11A. In this case, the total film thickness is increased by the overcoat in the position of the mark 10. As a result, the mark 10 appears like an emboss mark. when the overcoat paint 11A is washed away, then the undercoat 10A is also washed away and the mark 10 disappears.

Example (III) of Undercoat:

[0017] The undercoat 10A is formed by applying a water-soluble paint which is different from the overcoat paint 11A. For instance, the difference therebetween may be the color or colorants of the overcoat paint 11A and the undercoat paint (10A).

[0018] In case of different colorants, it is preferable that the undercoat paint is a dark color and the overcoat paint is a light color.

[0019] Further, it is also possible to use chemicals instead of the colorants or alternatively together with the colorants. Such chemicals are: an electron-releasing color-forming organic chemical for example known as dye, which is added in one of the undercoat paint (10A) and the overcoat paint 11A (preferably in the overcoat paint 11A); and an electron-accepting color developer which is added in the other, whereby the mark 10 becomes a different color from the surrounding color when the overcoat paint 11A contacts with the undercoat 10A and they react with each other. As the color-forming chemical, a phthalide type or fluoran type or spiropyran type color-forming chemical is used in combination with acid as the developer, for example organic acid such as citric acid tartaric acid or inorganic acid.

[0020] Aside from the above-mentioned combination of the dye and developer, a combination of a pH indicator such as phenolphthalein and an acid or alkali substance may be also used.

[0021] In any case, when the overcoat paint 11A is washed away, then the undercoat 10A is also washed away and the mark 10 disappears.

[0022] As to the method of indicating the tire date, there are various ways as follows.

[0023] In case of tire conicity, the direction of the conicity force should be indicated by the mark 10.

Method (1): A graphic symbol. e.g. circle and the like, of 5 to 30 mm in diameter or width is provided on the sidewall surface 3s on the leading side in the direction of the conicity force.

Method (2): A symbol such as plus (+) or minus (-) indicating the direction of the conicity force is provided on the surface 3s. For example, when one of the sidewalls 3 is provided with the tire manufacturer code, production number and the like and the other sidewall 3 is not provided with such information, the symbol may be provided on only the former, and the symbol plus (+) is used if the conicity force direction is from the latter to the former sidewall, and accordingly, if the direction is reverse thereto, the symbol minus (-) is used.

[0024] In case of RFV,

Method (3): the absolute value of RFV is printed in figure(s), or

Method (4): a relative value of RFV such as rank number (for example, ten ranks) is printed in figure(s). The latter is preferable rather than the former because it may be convenient for the worker to fitting the tires to a car. In Fig.1, a numerical character "7" is indicated as a rank number in ten ranks.

Use of indicated tire data

[0025] First, a tire which is suitable for each wheel of the vehicle is selected according to the data indicated by the protective film.

[0026] For example, in case of a vehicle having two steering wheels (front wheels) and two driving wheels (rear wheel) such as passenger car, tires having small RFV are mounted on the steering wheels, and tires having larger RFV are mounted on the driving wheel.

[0027] In case of the tire conicity, on a pair of a right wheel and a left wheel (front wheels, and rear wheels), two tires selected as follows are installed as shown in Figs.2a, 2b and 2c. The conicity force from the right tire and the conicity force from the left tire ideally cancel out or totally decrease. In other words, the conicity forces are directionally opposite and numerically close to each other. If as shown in Fig.3, the direction of the right tire is the same as the direction of the left tire, the wheels become liable to cause drift towards such direction.

[0028] when all the tires are installed, the protective film is removed by washing with water so that the tire date disappears.

Claims

1. A vehicle tire provided with a protective film which covers a surface of the tire, wherein the protective film is indicative of at least one of tire data including tire conicity and radial force variation of the tire and

Fig.1

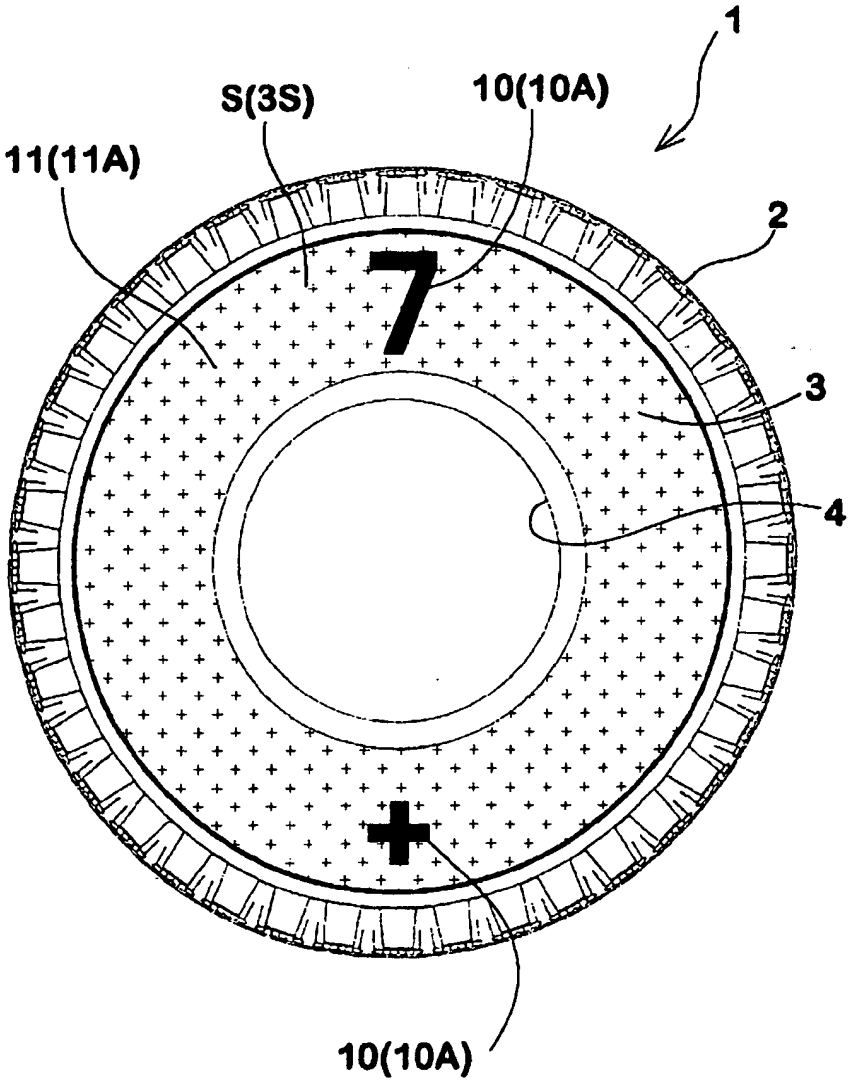
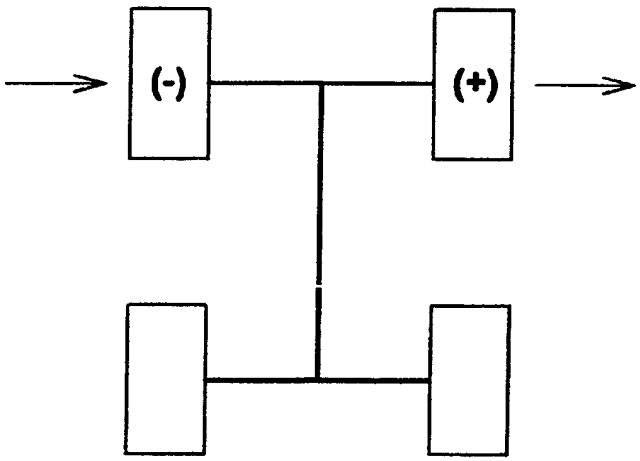


Fig.3



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 01 8520

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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16-10-2003

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